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  <TITLE>FAQ for isdn4linux: hardware: Supported hardware, its specialities, and hardware-relat
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<H2><A NAME="hardware_support"></A> <A NAME="ss5.1">5.1</A> <A HREF="i4lfaq.html#toc5.1">hardw
</H2>

<P>Only internal cards that plug into an ISA or PCI slot are
supported. ISA Plug&Play cards are also supported, but need some additional
manual configuration by means of the <CODE>isapnptools</CODE>. For details on the
configuration see question
<A HREF="i4lfaq-6.html#config_pnp">config_pnp</A>.</P>
<P>Internal cards may be
<A HREF="i4lfaq-29.html#glossary_active">active</A>,
<A HREF="i4lfaq-29.html#glossary_semiactive">semi-active</A>, or
<A HREF="i4lfaq-29.html#glossary_passive">passive</A>. Unless you have paid big money,
assume you have a passive card. More about the difference: see question
<A HREF="#hardware_activepassive">hardware_activepassive</A>.</P>
<P>Right now there is a driver for all passive card with certain Siemens
chipsets (HiSax driver). Have a look at the <CODE>README.HiSax</CODE> that comes with
the driver for the most up to date information on supported cards and which
parameter to pass to Hisax.
Here the status from 1st February 2002 (constantly improving):
<UL>
<LI>Teles 8.0/16.0/16.3 and compatible ones (like: Dr. Neuhaus Niccy
1016, Creatix 16/S0)</LI>
<LI>Teles 16.3c (can not be used as reversed card)</LI>
<LI>Teles S0/PCMCIA (old hardware)</LI>
<LI>Teles PCI</LI>
<LI>Teles S0Box</LI>
<LI>Creatix S0Box</LI>
<LI>Creatix PnP S0</LI>
<LI>Compaq ISDN S0 ISA card</LI>
<LI>AVM A1 (Fritz, Teledat 150 ISA)</LI>
<LI>AVM Fritz PCMCIA</LI>
<LI>AVM Fritz PnP</LI>
<LI>AVM Fritz PCI (Teledat 150 PCI)</LI>
<LI>AVM Fritz PCI v2</LI>
<LI>ELSA Microlink PCC-16, PCF, PCF-Pro, PCC-8</LI>
<LI>ELSA Quickstep 1000</LI>
<LI>ELSA Quickstep 1000PCI (new name: ELSA Microlink PCI)</LI>
<LI>ELSA Quickstep 3000 (same settings as QS1000)</LI>
<LI>ELSA Quickstep 3000PCI</LI>
<LI>ELSA PCMCIA</LI>
<LI>ITK ixl-micro Rev.2 (also: ITK colombus card)</LI>
<LI>Eicon DIVA 2.0 ISA and PCI (S0 and U interface, no PRO version)</LI>
<LI>Eicon.Diehl Diva 2.01 ISA and PCI</LI>
<LI>Eicon DIVA Piccola</LI>

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- ASUSCOM NETWORK INC. ISDNLink 128K PC adapter (order code I-IN100-ST-D)
- Dynalink IS64PH (OEM version of ASUSCOM NETWORK INC. ISDNLink 128K adapter)
- All other ASUSCOM/Dynalink cards (includes OEM versions; in total more than 50 card versions)
- PCBIT-DP (OEM version of ASUSCOM NETWORK INC. ISDNLink)
- HFC-2BS0 based cards (TeleInt SA1)
- Sedlbauer Speed Card (Speed Win, Teledat 100, PCI, Fax+)
- Sedlbauer Speed Star/Speed Star2 (PCMCIA)
- Sedlbauer ISDN-Controller PC/104
- USR Sportster internal TA (compatible Stollmann tina-pp V3)
- ith Kommunikationstechnik GmbH MIC 16 ISA card
- Traverse Technologie NETjet PCI S0 card and NETspider U card
- Dr. Neuhaus Niccy PnP/PCI
- Siemens I-Surf 1.x (with ISAR =< try type 29)
- Siemens I-Surf 2.x (with IPAC => try type 12 asuscom)
- Trust PCI (only the old one with Siemens chip; the one called 'Wisecom' in NL does not work)
- ACER P10
- HSR Saphir
- Berkom Telekom A4T
- Scitel Quadro
- Gazel ISDN cards
- HFC-PCI based cards
- PCI/Winbond W6692 based cards
- HFC-S+, HFC-SP/PCMCIA cards
- HFC-USB ISDN TAs
- ST5481 based USB ISDN adapters, e.g. BeWan Gazel 128 USB

Note:

- AVM A1+ is not supported
- PCF, PCF-Pro: up to now, only the ISDN part is supported
- PCC-8: not tested yet
- Eicon Diva U interface not tested
- Some cards do not work when compiled into the kernel, only when loaded as modules.
- Asuscom card: please note that the ISA version is a different type (12) then the PCI version (35 for HFC chip or 36 for Winbond chip)!
- To distinguish between HFC-PCI and PCI/Winbond, have a look at the output of <CODE>cat /proc/pci</CODE>. You have HFC-PCI if you have a line saying "Master capable" for your card.
- DataFire Micro V PCI = HFC-based card (type 35)
- Xircom Cardbus Eth10/100+ (PCMCIA) is not supported by isdn4linux, but you can use it like an active external ISDN terminal adapter (requires the xircom and serial driver).
- Gazel 128 USB from BeWAN Systems is supported as hisax_st5481 module.

For configuration hints have a look at:

http://www.poseern.org/my-prjs/isdn/.

</P>

<P>In Germany: every ISDN card which German Telekom distributed in the past is supported (the same is NOT true for the PBX they distributed).</P>

<P>The following cards are definitely not supported and will probably never be supported, since the manufacturers have not released the specifications for their very proprietary hardware/protocols:

Fritz!X

Eumex 404

</P>

<P>As for the Eumex 404, there is an unofficial binary driver for isdn4linux with Suse 6.3, which may or may not help you. Use it at your own risk:

http://home.t-online.de/home/Met

<H2> 5.2 </H2>

<P>An active ISDN card handles most of the ISDN connection protocols (dialing, accepting calls, etc.) itself. The card includes a kind of minicomputer with its own software (firmware). With a passive card, the computer in which the card is installed has to perform these functions.</P>

<P>In principle, both types are supported by isdn4linux. However, since active cards have non-standard interfaces, a driver can only be made when the producer publishes the specifications for the interface. Also, the card's firmware needs to be made freely available. In contrast, many passive cards share the same chipset. Therefore many passive cards can be supported once a driver supports this one chipset.</P>

<P>These active cards are currently supported by an individual driver:

AVM B1

AVM C4

Eicon DIVA Server BRI PCI

Eicon DIVA Server 4BRI

IBM Active 2000 ISDN card

ICN

PCBIT-D

</P>

<H2> 5.3 har</H2>

<P>The developers suggest using ELSA cards. ELSA has made their specifications available to the developers, and provided a lot of support, resulting in an excellent driver. Also, their cards are certified for usage in Germany, see question

country_certified.</P>

<P>If you want to buy an active card, then the developers would recommend the PCI Server from Eicon. The reason is that it can fax on both channels with AT class 2 commands, and includes a V.90 modem.

The AVM B1 works also very well, and is likewise recommended. Old versions (up to 3.0) could receive faxes only on one channel, but since AVM B1 PCI V4 all channels can be used simultaneously for sending and receiving faxes.

See also question

hardware_avmb1 for more details about this card.

The Hypercope cards have also been reported to work very well, servicing all available channels for faxing. However, they require a hardware update for faxing and their linux driver is fairly new. See also question

hardware_hypercope for more details about this card.</P>

<P>If faxing is important for you, but you don't want to spent the money for an active card, then a card with ISAR chipset may work well for you, e.g.

Sedlbauer Speedfax+ (in Germany you may be able to buy it at Conrads).</P>

<P>And if you want to buy a USB terminal adapter, then the Gazel 128 USB from BeWAN Systems

http://www.bewan.com has been reported to work fine with the hisax_st5481 module.</P>

<H2> 5.4 hard</H2>

<P>Generally not, but it doesn't need to. Terminal adapters are designed to behave either like a modem or like a network card. Linux already supports both modems and network cards without isdn4linux - so no special ISDN driver is necessary (which usually greatly simplifies the configuration).

For example, have a look at the dialout program wvdial.</P>

<P>However, there is (at least) one exception. The Gazel 128 USB from BeWAN System in France

http://www.bewan.com has been reported to work fine with the hisax_st5481 module. For configuration hints have a look at:

http://www.poseern.org/my-prjs/isdn/.</P>

<H2> 5.5 hard</H2>

<P>For any details in this direction have a look at the excellent cable FAQ, which can be found at least in a German version at:

http://www.in-berlin.de/User/scon

<H2> 5.6 hardware</H2>

<P>On many PCI boards, interrupt 12 is often used by a PS/2 mouse (even though you may not have any or the IRQ is not activated for it). It may be used even when you have no PS/2 port. Interrupt 15 is also often used by the second IDE bus (even when you are not using it or the IRQ is not activated for it). Even though one thinks that some IRQs are available they are still somehow reserved by the BIOS. Good IRQs to try are always IRQ 5 and IRQ 9. Without mice or modems you could also try 4 and 3, which works even on very exotic boards.</P>

<H2> 5.7 ha</H2>

<P>Yes, the drivers have been written to work with shared interrupts. However, at least for the AVM Fritz!PCI card occasional problems have been reported for motherboards with a BIOS bug (DFI motherboards K6BV3+, P5BV3+ K6XV3). Try to disable the BIOS option <CODE>CPU to PCI WRITE Buffer</CODE> in those cases as a workaround.</P>

<H2> 5.8 hardware</H2>

<P>At least these S2M cards have been reported to work:

AVM T1

Eicon S2M-ISA or DIVA Server PRI family (see

http://www.melware.de/)

</P>

<H2> 5.9 hardwa</H2>

<P>At least these PCMCIA cards have been reported to work:

ELSA Microlink (NOT: ELSA Microlink/all)

Sedlbauer

AVM

Teles PCMCIA (old hardware) - deprecated, since Teles often changes hardware, and does not support the developers (see question

hardware_teles).

</P>

<H2> 5.10 hardwa
</H2>

<P>Yes, this works nicely. However, make sure to compile the kernel and all modules with option <CODE>SMP</CODE>. If you run into problems when both CPUs try to handle the same IRQ, try to boot with <CODE>noapic</CODE>.</P>

<H2> 5.11 hard
</H2>

<P>Yes, most cards should run with isdn4linux on a DEC Alpha. Many cards have been reported to work with the HiSax driver. Also the active ICN card has been reported to work.</P>

<H2> 5.12 hardwa
</H2>

<P>Probably not. There are three options for (internal) isdn in the SUN enviroment:

 SBUS ISDN adapter:

Old SUN-workstations used to have a SBUS interface for additional peripheral boards.

There exists an ISDN sbus board sold as "Xl012". As no information is available for these boards, they are NOT supported!

 Built-in ISDN adapter:

Sparc-Station-LX, Sparc-Station-10 and Sparc-Server-10 have a motherboard with build-in isdn-adapter.

These machines were supported by HISAX (kernel 2.3.0) but the code has been left unsupported for very long (over nine months).

All kinds of ancient hisax definitions are still left in these drivers.

Much work is to be done to get it properly working again.

Note from the original developer, not to expect too much: the dbri chip is not capable of buffering (irq for each byte) and raw-hdlc has to be done in software instead of hardware...

The author of dbri.c has stopped active work on it, but made a copy of the DBRI data sheet available at:

http://www.freesoft.org/Linux/DBRI

for anyone who wants to fix the remaining glitches (status as of Jan 10, 2000). Please be aware that the code of the latest developments can not be compiled for 32 bit machines like all sun-4m machines.

 PCI ISDN adapter:

Modern SUN-workstations and servers have a different busstructure nowadays. The ULTRA series uses the PCI-bus.

Allthough some pc boards seem to be working in a SUN, there are NO reports (yet) of properly functioning ISDN-PCI-boards in the SUN environment. Please write me if anyone ever succeeds.

</P>

<H2> 5.13 hardwa
</H2>

<P>Yes, most cards should work. However, at least the AVMFritz!PCI card won't work, due to the different Endian format for 32bit B-channel data on the PPC.</P>
<P>In any case, you may also get a terminal adapter (= external ISDN "modem"). Since then you don't need isdn4linux (see question hardware_external), this is not covered here any further.</P>

<H2> 5.14 h
</H2>

<P>It depends on the availability of slots, interrupts/IO addresses in your computer as well as the possibilities of the ISDN card. Most passive cards are limited by the supported IO addresses (e.g.: Teles 16.x: only 3 addresses are legally possible: 0xf80, 0xd80, 0xe80), and the total usage of interrupts (every card needs one).</P>
<P>To use more cards, the ICN card may be your choice. It has no interrupts, a more flexible port configuration and the driver places the shared memory area of all ICN cards at the same address. The card memory is shown only as needed. Therefore, one can use as many cards as there are slots.</P>
<P>If you really need a lot of ports, then eventually, a S2M card might be interesting for you, see question hardware_s2m.</P>
<P>See question config_manycards about the specialities for the configuration of more than one card.</P>

<H2> 5.15 hardwa
</H2>

<P>Cards with an HFC-PCI chip allow some specialities that are not possible with other ISDN cards. So it is possible to run the card in NT mode (requires crossing the ISDN connection and change by software) - this means you can simulate to another ISDN card that your card is an NTBA (however, since isdn4linux does not implement the level 3 protocol used by the exchange, you can only use this mode like a leased line). Also, it is possible to give up one B-channel in exchange for reading the complete D-channel protocol, which is great for isdnlog. The later can also be done with a reversed card (see question isdnlog_reversedcard) but with HFC chips this works much more reliably and cleanly. You can activate this special echo mode by calling:

<HR>
<PRE>
hisaxctrl <driver_name> 10 1
hisaxctrl <driver_name> 12 1
</PRE>
<HR>

You can deactivate it by calling:

<HR>
<PRE>
hisaxctrl <driver_name> 12 0
hisaxctrl <driver_name> 10 2
</PRE>
<HR>

Parameter 10 changes the number of available channels, parameter 12 switches the echo mode.</P>

<P>Cards with HFC chips may be difficult to run on older mainboards. Ensure with <CODE>lspci -v</CODE> that an IRQ has been assigned to the card (if not check the PnP bios settings). Verify that the card is located in a slot with busmaster DMA capabilities. Verify whether the kernel is compiled such that it will run on your CPU (newer distributions may not run on CPUs like 486 or Pentium; Suse provides the kernel 'k_i386' to run with older hardware).</P>

<H2> 5.16 hardware</H2>

<P>Generally, ELSA supports the ISDN4LINUX developers quite well with documentation on how to access their cards. Thus, these cards are well supported and very recommendable for use under ISDN4LINUX. Also, the ELSA Quickstep 1000 PCI (new name Microlink PCI) is one of the only brands of cards that are officially certified for use in Germany, and therefore in EC (see question

country_certified for more information on certification).</P>

<P>However, there is a speciality with some non-PCI-conformal mainboards and the ELSA Quickstep 1000pro-PCI. These mainboards set the IO address to incorrect values (they need to be on 0x100 boundaries, and in a higher area). This may create an error message like

"You may have the wrong PCI bios" and hang the system. The best fix is a Bios upgrade. If this is not feasible, you can get the module

<CODE>pcitest</CODE> from Karsten Keil <CODE>

keil@isdn4linux.de</CODE>. It will initialize the card then exit with an intentional error (thus not occupying any memory).</P>

<P>To interface from ELSA's RJ11 plug to an RJ45 cable, use the following cabling scheme:

<PRE>

| | | | |
|-------|------|---|----------|
| | RJ11 | - | RJ45 |
| pins | 1234 | | 12345678 |
| Cable | abcd | | --abcd-- |

</PRE>

</P>

<P>Regarding the Elsa Microlink ISDN USB: contrary to previous announcements it does NOT works like a serial terminal adapter with the USB communication class driver. Currently, it is not supported by isdn4linux.</P>

<H2> 5.17 </H2>

<P>The Sedlbauer card comes in several versions:

 Sedlbauer Speedwin

 Sedlbauer Speedfax

 Sedlbauer Speedfax PCI

</P>

<P>The Speedwin is a normal passive card with no specialities.</P>

<P>The Speedfax has a very special hardware: it is a semiactive card based on the ISAR chipset which supports sending/receiving faxes and an analog modem up to 14400. It is special in that you use it with HiSax which normally works only for passive cards.

As all active card you have to load its firmware (in this case after loading HiSax) from the file ISAR.BIN, which is part of the isdn4k-utils.</P>

<P>Please note that compression (V42bis, MNP) are not implemented in firmware, and therefore not supported when using the analog modem. The ideal init string for the card to allow modem dialin is <CODE>AT%CO\N0</CODE>.</P>

<P>If for some fax senders receiving by Hylafax does not work, then try to set the following configuration parameter for Hylafax:

<HR>

<PRE>

Class1SwitchingDelay: 75

</PRE>

<HR>

</P>

<P>The Sedlbauer Speedfax PCI is special in that it was produced just for Linux - there is no driver for it under Windows.</P>

<H2> 5.18 hard</H2>

<P>First the latest news: according to the German magazine ct 02/2001, Teles has closed down its business activities in the ISDN area. Therefore, this FAQ does not really apply any more. However, I'll keep this FAQ for now to document Teles' attitude towards their customers. The author has had personal experience with Teles since 1994.</P>

<P>One of the most frequently asked questions for Teles cards: The Teles card 16.3c has a crippled FIFO, therefore it is required to use <CODE>AT&B1024</CODE> when using the ttyI* devices (if the remote side still send packets with more than 1024 bytes it will not work - unfortunately many CAPIs use 2048 bytes as default).

The latest Teles PCI card needs the <CODE>netjet</CODE> driver, the teles driver will NOT work (that card identifies itself as 'TigerJet Tiger300' when doing a <CODE>cat /proc/pci</CODE>).</P>

<P>Now some comments about Teles in general (these are the personal opinions of the author of this FAQ, please blame nobody else than me):</P>

<P>Teles' business practices are very customer- and developer-unfriendly when compared to those of other companies. Naturally, the developers give priority to cards for which support is available, and where the specifications are freely available.</P>

<P>So far, Teles has had a very unfriendly attitude towards the i4l developers. No support has ever been received from them, and they don't publish any information about how to access their card. The developers have invested a lot of private effort into getting this card to work from the beginning without receiving any support. The driver has been a complete private effort. Yet, Teles has bragged on their web site that their cards run under Linux, without giving proper credit.</P>

<P>Even companies that buy Teles cards and resell them under their own name have not been able to improve the support. This has lead to the situation where a re-branding company (!) itself had to go through the effort of obtaining approval to legally use i4l in Germany on a Teles card.</P>

<P>From a customer point of view, check out the prices for their hotline before you buy any hardware from them! The author of the FAQ refuses to use any hotline that charges 216,- DM per hour. Reports about quality and waiting time have not always been favorable.</P>

<P>And this company did not even give away drivers for other operating systems, like Windows, for free for many years (I know about 1995-2000). Only since about April 2000 you can download the drivers over the Internet. Before you had to dial up a very expensive number (0190) where you had to pay about DM 1,20 per minute in Germany to download the driver. Not that it's advisable to use Windows anyway, but just to let you know...</P>

<P>Warning: Teles has often changed their cards without notice, while still using the same name. When you buy a Teles card, you may find out that your brand-new card can not be supported by i4l! (As has happened many

times in the past...)</P>

<P>The developers will try to support new Teles cards when information about how to access it becomes available, and when they have no other priorities. Of course you can always send a patch.</P>

<H2> 5.19 hard</H2>

<P>The Fritz! card comes in different variations. Since the PCI card and the ISA/PNP card have the same type (27), hisax will assume an ISA/PNP card if you pass an io address, and a PCI card if you do NOT pass an io address. Make sure to give the parameters properly.</P>

<P>The newest Fritz! PCI card (v2.0) is now supported by a new driver, however it has not yet been tested thoroughly. The card can be identified by lspci returning 0e00 as the card id.</P>

<P>If the interrupt for the card is shared with other devices and your card does not work, then there could be an issue with the motherboard. See question hardware_irqsharing for this.</P>

<P>One very interesting thing: the Fritz! card is currently the only passive card for which a capi driver exists. As a result, it can be configured to fax. See question

feature_capi and

http://www.avm.de/ftp/cardwa for more information on this. Usage of the capi driver is completely optional, you might as well stay with the standard driver if you do not need capi support.</P>

<H2> 5.20 hard</H2>

<P>This card supports many special features in its firmware and is very well supported by its Linux driver. It's currently one of the only ISDN cards that you can use to fax under ISDN4LINUX, or which supports the CAPI 2.0 interface. You can get the newest driver from:

ftp://calle.in-berlin.de/pub/capi4linux/ To get the firmware download the two perl scripts from:

ftp://calle.in-berlin.de/pub/capi4 They will download and extract the firmware from tar files on the avm ftp server on:

ftp://ftp.avm.de/cardware/b1/linux/.</P>

<P>To use the AVM on a point-to-point connection ("Anlagenanschluss") add "DSS1 P2P" to the load command for the firmware, like:

<HR>

<PRE>

```
avmcapictrl load /usr/lib/isdn/b1.t4 0 DSS1 P2P
```

</PRE>

<HR>

</P>

<P>There is also a mailing list for problems with the AVM B1 available on: linux-avmb1@calle.in-berlin.de (send an email to majordomo@calle.in-berlin.de with <CODE>subscribe linux-avmb1 <your email address></CODE> in its body). </P>

<H2> 5.21 </H2>

<P>These cards support several special features in their firmware. They are newly supported by a Linux driver. They are currently one of the only ISDN cards that support the CAPI 2.0 interface. Also, you can use them very well for faxing under ISDN4LINUX (after upgrade with a fax card - possible for HYSDN Ergo2 and HYSDN Metro4).</P>

<P>More information on company and hardware is available on:
http://www.hypercope.de
Configuration is similar to that of an AVM B1.</P>

<H2> 5.22 hardware</H2>

<P>This was the first active card supported by isdn4linux. The manufacturer has always supported i4l developers (<CODE>
http://www.think.de</CODE>).
The ICN does not need any interrupt (polling), therefore a PC can be equipped with many of them without any interrupt conflicts. The newest firmware should be available at
<CODE>

ftp://ftp.think.de/pub/isdn4linux/icn/firmware/
Unfortunately, the ICN is not produced any more.</P>

<H2> 5.23 hardware</H2>

<P>There are several interesting things.

 Two Versions: There are two different versions (version 1.0 and version 2.0) with a different chipset. Both work fine, however you have to set the type properly (29 for version 1.0, 12 for version 2.0).
 PnP bug: Due to a bug in the pnp chip it is very important for the I-Surf 1.0 to have the following PEEK and POKE lines in your isapnp file to properly initialize the PnP register:

<HR>

<PRE>

```
(MEM 0 (BASE 0x0c8000) (MODE bu) (UPPER 0x0c8400))  
# (MEM 0 (BASE 0x0c8000) (MODE br) (UPPER 0x000400))  
(REG 0x31 (PEEK))  
(REG 0x31 (POKE 0))  
(REG 0x31 (PEEK))  
(ACT Y)  
)
```

</PRE>

<HR>

 Memory mapping: Since the I-Surf 1.0 uses memory mapping for the ISA bus, ensure that the used memory area is not shadowed or cached (see BIOS setup).

 Firmware loading: Before usage you have to load the firmware:

<HR>

<PRE>

```
hisaxctrl &lt;id> 9 ISAR.BIN
```

</PRE>

<HR>

(You find the file ISAR.BIN in the isdn4k-utils or on the I-SURF cd.)

 Fax: The I-Surf 1.0 can be setup to send and receive faxes (see question

feature_fax for details).

</P>

<H2> 5.24 hardware</H2>

</H2>

<P>This behavior is typical for a cable with confused a/b wiring. Some NT from Quante had a wrong labeling. They caused exactly the mentioned behavior if the PBX was connected to the plug of the NT and the ISDN card to the pins of the NT. As soon as some device activates the bus the other one can no longer get through.</P>

<H2> 5.25 </H2>

<P>This question assumes that you are connected by an internal bus that you installed, attached directly to the NT (without using an RJ45 cable).</P>

<P>The easiest way to test it is to buy a little cable tester (the author of this FAQ got one from Conrad Electronics in Germany for 29,- DM - just follow the simple instructions).</P>

<P>Otherwise you have a bit more work. Switch line a1 and b1. If it doesn't work, put them back and switch a2 and b2. If it still doesn't work, try switching them both. As long as {a|b}1 and {a|b}2 are kept, nothing can break. If you want to be sure, before plugging it in measure between pins 4 and 5 and between Pins 2 and 6 on the socket; there should be no current, but between 3 and 4 and between 6 and 5 should be 40 V, 6 and 3 positive.</P>

<P>With the Western plug this works similar. 4 lines are used:

```
<PRE>
| | | |
| | | |
1 2 3 4
</PRE>
```

Then you can try to switch (1 with 4) or (2 with 3) or both. Never switch the outer with the inner lines - this would cross the RX and TX lines and nothing will work.</P>

<P>Check the Cable FAQ for more details on which line should be connected how.</P>

<P>If both devices are attached via RJ45, then one of the cables has been twisted. That usually happens if one of the RJ45 plugs has been attached upside-down (a1/b1 are inside, a2/b2 are outside, so the order of the sending/receiving pairs is maintained), then you just need a new plug and of course pliers for the RJ45, old plug off, and new plug (in the right direction) on.</P>

<H2> 5.26 hardware</H2>

<P>Many PBX run non-standard ISDN protocols on their internal bus. This may cause i4l to print warnings like "Unexpected discriminator 0xZZ" (where ZZ is a hexadecimal number) when it encounters unexpected frames (some old versions even crash). This can increase your message file by as much as 1 MB in 3 days. The PBX <CODE>Ackermann Euracom 181</CODE> (discriminator 0xaa) as well as <CODE>Ascom</CODE> (discriminator 0x44/0x47) seem to be notorious for this. You can avoid the warning by adjusting the switch/case code for isdnlog in function <CODE>processctrl(...)</CODE> in <CODE>processor.c</CODE> and recompiling isdnlog. Please note that isdnlog will not be able to log any incoming data packages, since the PBX has to forward the packages. To see everything, you have to bypass the PBX.</P>

<P>Please be aware, that the PBX may hang if the ISDN card does not respond to the PBX requests - bypass the PBX in such a case.</P>

<P>Also, a PBX may run lTR6 protocol on the internal bus by default, rather than Euro ISDN. You have to configure i4l (or the PBX) accordingly, best is you try to configure both on the same or similar protocols.</P>

<P>Also the MSN may be different than you expect. Check several versions, no

digit (then use `<CODE>0</CODE>`, which i4l will require in such a case), one digit, or two digits, or the whole MSN. Best is you call some device (e.g. ISDN telephone) on the internal bus and check what i4l writes into the log file.</P>
<P>When you can not dial out, the most common problem is that you have not set the MSN properly for outgoing calls, which causes the PBX to refuse your request.</P>

<P>For dial in be aware that some PBX add a leading 0 to any incoming telephone number, so adjust your configuration for the secure option accordingly.</P>

<P>Last, remember that you may have to configure your PBX to 'route' incoming calls onto the internal ISDN bus.</P>

<P>If you have a point-to-point configuration ('Anlagenanschluss') then you cannot connect your card directly to the S0 bus in parallel to the PBX (otherwise nothing will work). You have to connect to an internal ISDN bus. Your MSN is usually the extension at the end of your telefon number.</P>

<P>If your PBX is the `<CODE>Ackermann Euracom</CODE>`, then you may also check out this German site for the configuration software maKs:

http://www.ganzfix.de </P>

<H2> 5.27 </H2>

<P>It's probably not a Plug 'n Play card at all - even though Teles now prints PNP on all their card and packaging. The difference is easy to recognize: a real Teles PNP card no longer has the (tiny) Dip switches on the card to set the IO addresses.</P>

<H2> 5.28 </H2>

<P>These blinking LEDS are often caused by a bad cable or a too long or unterminated S0 bus.</P>

<H2> 5.29 hardware_elsairq</H2>

<P>This is normal. The ELSA Quickstep 1000 ISA card has a hardware timer on the card which can not be disabled by software. You have to modify the card hardware to get rid of it. Check with Karsten Keil for this:

<CODE>

keil@isdn4linux.de</CODE></P>

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